

I. REMARKS

The final Office Action dated April 18, 2008, has been received and carefully noted. The amendments made herein and the following remarks are submitted as a full and complete response thereto.

Claims 1-5 are pending in this application.

No amendments are submitted in this Response. Applicants submit a Declaration under 37 C.F.R. 1.132. Entry of this evidence is proper under 37 C.F.R. § 1.116 since the evidence: (a) places the application in condition for allowance for reasons discussed herein; (b) does not raise any new issues regarding further search and/or consideration since the evidence amplifies issues previously discussed throughout prosecution; and (c) places the application in better form for appeal, should an appeal be necessary. The Declaration and related remarks are necessary as they are made in reply to arguments raised in the rejection.

Claims 1-5 are rejected under 35 U.S.C. § 103(a) over Deibert et al. (U.S. Patent No. 3,442,715) in view of Joshi et al. (U.S. Patent No. 5,454,922). Applicants traverse the rejection.

Claim 1 of the presently claimed invention is directed to a "paste composition for making electrodes of fuel cells, comprising 1 to 20 weight % of a carbon black supporting a hydrogen reduction catalyst, 1 to 30 weight % of an electrolyte, 1 to 50 weight % of an organic solvent with a boiling point of 100 to 200°C, and 30 to 80 weight % of a water-soluble organic solvent with a boiling point of less than 100°C" (emphasis added). Claims 2-5 depend from independent claim 1.

Applicants submit that Deibert et al. and Joshi et al. do not teach or suggest the presently claimed invention. As argued previously, for example, in our Response dated February 19, 2008, Applicants submit that the cited references fail to teach or suggest a paste composition for making electrodes, which comprises each component in the amount specifically claimed in independent claim 1 and dependent claims 2 to 5.

Applicants submit that the presently claimed invention achieves unexpected results. For example, the paste composition of the presently claimed invention unexpectedly is "excellent in storage stability, [and] can give electrodes that have a sufficient pore volume for high generating performance" (specification, page 2, lines 3-5) (emphasis added). Further, Applicants submit that the presently claimed composition "comprises organic solvents of a specific boiling point... [which] make it possible for the solvent of the paste composition to evaporate at a controlled rate under drying conditions in the electrode production" (specification, page 2, lines 6-9) (emphasis added). Applicants submit that Deibert et al. and Joshi et al. do not disclose or suggest the unexpected and remarkable effects of the presently claimed paste composition for making electrodes which comprises "1 to 20 weight % of a carbon black supporting a hydrogen reduction catalyst, 1 to 30 weight % of an electrolyte, 1 to 50 weight % of an organic solvent with a boiling point of 100 to 200°C, and 30 to 80 weight % of a water-soluble organic solvent with a boiling point of less than 100°C" (claim 1).

In response to the Examiner's assertion that the "Applicants must provide further evidence between the instantly claimed invention in contrast to the prima facie case of unpatentability utilizing the Diebert reference," Applicants submit a Declaration demonstrating the unexpected results of the claimed composition.

The enclosed Declaration provides data comparing the presently claimed paste composition with paste compositions having components provided in amounts outside the claimed ranges. Applicants refer to the enclosed Table, which shows Comparative Examples 1 to 4, which are described in the specification, as well as Comparative Examples 5 to 12, which refers to additional experiments conducted and described in the Declaration. Applicants note that the Comparative Examples in the Declaration refer to paste compositions in which the following components are provided in amounts outside of the claimed ranges: carbon black (Comparative Examples 5 and 8), electrolyte (Comparative Examples 6 and 9), water-soluble organic solvent with a boiling point less than 100°C (Comparative Examples 7 and 11), and organic solvent with a boiling point of 100 to 200°C (Comparative Examples 10 and 12).

As described in the Declaration, Applicants submit that paste compositions with components provided in amounts outside of the claimed ranges do not demonstrate the unexpected properties of the presently claimed invention.

For example, Applicants submit that the presently claimed compositions have a higher pore volume. Applicants refer to Table 1 on page 24 of the specification, which shows that paste compositions in accordance with the presently claimed invention, Examples 1 to 3, have a pore volume of 0.64 to 0.76. In contrast, paste compositions with components outside of the claimed ranges generally have a lower pore volume, as seen in Table 1 of the Declaration.

In addition, Applicants submit that the presently claimed compositions have a higher voltage between terminals. Applicants refer to Table 2 on page 25 of the specification, which shows that paste compositions in accordance with the presently claimed invention

have the following voltage values: at a low temperature and high humidity (50°C and 90% or more relative humidity), 0.65 to 0.70 V at a density of 0.5 A/cm² and 0.45 to 0.50 V at a density of 1.0 A/cm²; and at a high temperature and high humidity (80°C and 90% or more relative humidity), 0.71 to 0.75 V at a density of 0.5 A/cm² and 0.55 to 0.62 V at a density of 1.0 A/cm². In contrast, paste compositions with components outside of the claimed ranges, when measurable, have lower voltage values. For example, at a low temperature and high humidity (50°C and 90% or more relative humidity), such compositions demonstrate 0.40 to 0.50 V at a density of 0.5 A/cm² and 0.20 V at a density of 1.0 A/cm²; and at a high temperature and high humidity (80°C and 90% or more relative humidity), such compositions demonstrate 0.48 to 0.54 V at a density of 0.5 A/cm² and 0.23 V at a density of 1.0 A/cm².

Therefore, Applicants submit that the presently claimed electrode paste compositions have the remarkable and unexpected properties of high pore volume and high voltage between terminals.

Applicants submit that Deibert et al. and Joshi et al. fail to teach or suggest all of the elements of the presently claimed invention, as set forth in independent claim 1 and dependent claims 2-5, and the unexpected results found with the presently claimed invention. Therefore, Applicants respectfully request reconsideration and withdrawal of the rejection of claims 1-5 under 35 U.S.C. § 103(a) over Deibert et al. in view of Joshi et al.

II. CONCLUSION

Applicants respectfully submit that this application is in condition for allowance and such action is earnestly solicited. If the Examiner believes that anything further is desirable in order to place this application in even better condition for allowance, the Examiner is invited to contact Applicants' undersigned representative at the telephone number listed below to schedule a personal or telephone interview to discuss any remaining issues.

In the event this response is not timely filed, Applicants hereby petition for an appropriate extension of time. The fee for this extension, along with any other additional fees which may be required with respect to this response, may be charged to Deposit Account No. 01-2300, referencing Attorney Docket No. 026035-00009.

Respectfully submitted,

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Enclosures: Table
Declaration under 37 C.F.R. § 1.132

	Carbon black supporting a catalyst wt%	Electrolyte wt%	Water-soluble organic solvent with a boiling point of less than 100°C		Organic solvent with a boiling point of 100 to 200°C		Other organic solvent		Distilled water		Carbon fiber wt%	Dispersant wt%
			Type	wt%	Type	wt%	Type	wt%	wt%	wt%		
Claim	1-20	1-30		30-80		1-50		-	-	-	-	-
Ex 1	6.9	5.2	n-propyl alcohol ethanol	52.6	n-butyl alcohol	17.7	Not used	0	15.5	19	0.1	
Ex 2	5.0	3.8	n-propyl alcohol ethanol	38.4	butyl acetate	39.9	Not used	0	11.3	1.4	0.1	
Ex 3	6.9	5.2	n-propyl alcohol ethanol	52.6	1-ethoxy-2-propyl alcohol	17.7	Not used	0	15.5	1.9	0.1	
Comp. Ex 1	6.9	5.2	n-propyl alcohol ethanol	70.3	Not used	0	Not used	0	15.5	1.9	0.1	
Comp. Ex 2	5.6	4.2	n-propyl alcohol ethanol ethyl acetate	75.9	Not used	0	Not used	0	12.6	1.5	0.1	
Comp. Ex 3	6.9	5.2	n-propyl alcohol ethanol	52.6	Not used	0	Cyclohexane	17.7	15.5	1.9	0.1	
Comp. Ex 4	6.9	5.2	n-propyl alcohol ethanol	70.4	Not used	0	Not used	0	15.6	1.9	0	
Comp. Ex 5	5.9	5.2	n-propyl alcohol ethanol	52.6	n-butyl alcohol	23.7	Not used	0	15.5	1.9	0.1	
Comp. Ex 6	6.9	5.2	n-propyl alcohol ethanol	61.1	n-butyl alcohol	17.7	Not used	0	11.4	1.9	0.1	
Comp. Ex 7	6.9	5.2	n-propyl alcohol ethanol	23.3	n-butyl alcohol	47.0	Not used	0	15.5	1.9	0.1	
Comp. Ex 8	25.0	5.3	n-propyl alcohol ethanol	35.4	n-butyl alcohol	17.9	Not used	0	15.7	0.7	0.1	
Comp. Ex 9	5.1	3.8	n-propyl alcohol ethanol	37.4	n-butyl alcohol	6.1	Not used	0	16.2	1.4	0.1	
Comp. Ex 10	5.1	3.8	n-propyl alcohol ethanol	32.0	n-butyl alcohol	51.0	Not used	0	6.7	1.4	0.1	
Comp. Ex 11	3.7	2.8	n-propyl alcohol ethanol	35.3	n-butyl alcohol	2.2	Not used	0	4.9	1.0	0.1	
Comp. Ex 12	6.9	5.2	Not used	0	N,N-dimethyl acetamide n-butyl alcohol	75.4	Not used	0	10.5	1.9	0.1	

Outside the claimed ranges